CLAIMS

What is claimed is:

1. A light modulator, comprising:

a plurality of modulator elements arranged substantially in parallel, wherein:

each modulator element includes:

an optically active portion; and

a support portion on either side of the optically active portion, wherein the optically active portion has a narrower width than the support portion.

2. The light modulator of claim 1, wherein:

the optically active portion remains substantially flat while deflected.

3. The light modulator of claim 2, wherein:

the optically active portion further includes upper and lower surface areas having substantially equal optical energies.

4. A movable membrane for light modulation, comprising:

a substantially circular optically active portion; and

a released membrane portion surrounding the circular optically active portion, wherein:

the substantially circular optically active portion includes a plurality of gaps configured to expose a lower surface.

5. The movable membrane for light modulation of claim 4, wherein:

the substantially circular optically active portion remains substantially flat while deflected.

6. The movable membrane for light modulation of claim 5, wherein:

an area of the lower surface exposed through the plurality of gaps is substantially equal to an upper surface area.

7. The movable membrane for light modulation of claim 5, wherein:

an optical energy of the lower surface exposed through the plurality of gaps is substantially equal to an upper surface optical energy.

8. A micro electromechanical system (MEMS) device capable of light modulation, the device comprising:

a membrane configured to be controllably deflected;

a support structure configured to support the membrane;

an optically-active portion of the membrane that is reflective and configured to be illuminated;

a non-optically-active portion of the membrane between the optically-active portion and the support structure; and

a plurality of gaps in the optically-active portion of the membrane.

9. The device of claim 8, further comprising:

a substrate below the membrane having reflective areas under the plurality of gaps.

10. The device of claim 9, wherein the non-optically-active membrane portion is substantially larger in area than the optically-active membrane portion.

11. The device of claim 10, wherein the optically-active membrane portion bends less than the non-optically-active membrane portion when the membrane is controllably deflected.

12. The device of claim 11, wherein the optically-active membrane portion remains substantially flat when the membrane is controllably deflected.

13. The device of claim 9, wherein the gaps in the optically-active membrane portion are configured so that substantially equal optical energies are reflected from the membrane and from the substrate below the membrane.

14. The device of claim 13, wherein both the optically-active membrane portion and the reflective areas under the gaps are covered with a same reflective material.

15. The device of claim 14, wherein the reflective material comprises aluminum.

16. The device of claim 8, wherein the membrane comprises a compliant material from a group of compliant materials including polymeric materials, metals, polycrystalline materials, and amorphous materials.

17. A method of light modulation using a MEMS device, the method comprising:

applying a controllable force to deflect an element having an optically-active portion that is reflective and a non-optically-active portion between the optically-active portion and a support structure;

illuminating the optically-active portion of the element with light at a pre-determined wavelength;

reflecting a first portion of the light from the element; and

reflecting a second portion of the light from a reflective surface below a plurality of gaps in the optically-active portion of the element,

wherein the non-optically-active portion is substantially larger than the optically-active portion.

18. The method of claim 17, wherein the element comprises a deflectable membrane.

19. The method of claim 17, wherein the element comprises a plurality of deflectable ribbons.

20. An apparatus comprising:

means for applying a controllable force to deflect an element having an optically-active portion that is reflective and a non-optically-active portion between the optically-active portion and a support structure;

means for illuminating the optically-active portion of the element with light at a pre-determined wavelength;

means for reflecting a first portion of the light from the element; and

means for reflecting a second portion of the light from a reflective surface below a plurality of gaps in the optically-active portion of the element,

wherein the non-optically-active portion is substantially larger than the optically-active portion.